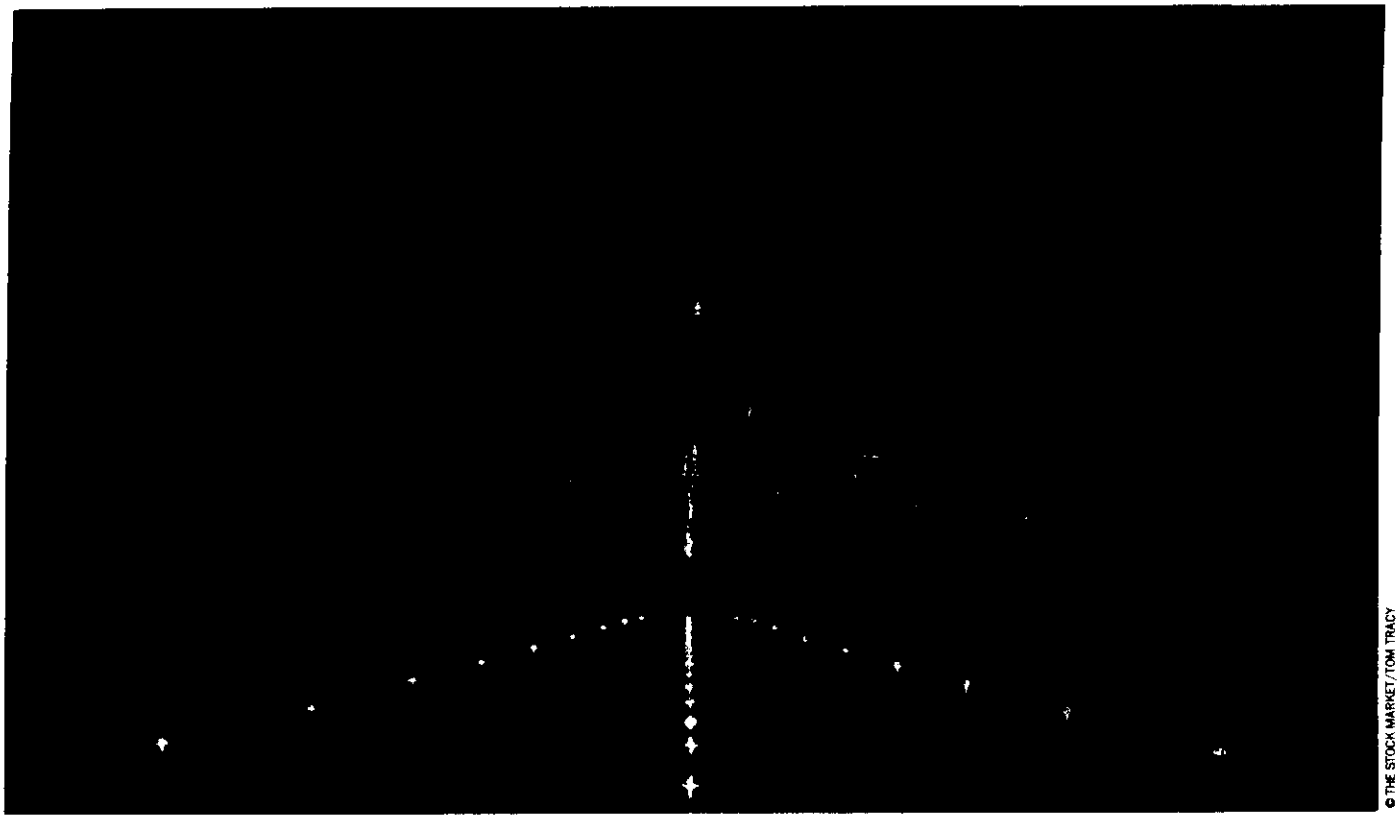
Special Report

Airline Safety



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Although U.S. airline travel is among the world's safest, the system has critical flaws that the government and industry don't want you to know about. For this article, we interviewed leading air safety and industry experts; present and former government officials; pilots; air-traffic controllers; mechanics; flight attendants and survivors of air crashes. We also analyzed thousands of pages of relevant government documents. In the end, this story is about the Federal Aviation Administration and its "dual mandate"—to "encourage" air travel at the same time it is charged with ensuring passenger safety. These are not always compatible goals. Although the level of incompetence charged by critics is hard to believe, it is clear that the FAA, for whatever reason, is not protecting you as well as it could. What follows is the result of a nine-month investigation; it tells you what you need to know to protect yourself and your family.

By John F. Wasik

Flight attendant Jan Brown-Lohr has a personal definition of "unbelievably terrifying," based on her experience of a 1989 airline crash in which 112 people died and 186 survived. It's crawling out of a pitch-dark, upside-down DC-10 aircraft that has crashed in a cornfield near Sioux City, Iowa. She had to leave the wreckage due to "prohibitive and deadly smoke." When she got out, she was confronted by a mother who lost her child. As the plane was falling, she told the mother to place 22-month-old Evan Tsao on the floor of the aircraft—there was no requirement to restrain him and no device in which to do so. She did the best she could in a hellish situation by following current federal law, but it clearly was not good enough.

Brown-Lohr, a 22-year-veteran flight attendant, is an expert on air safety. When talking about safety, her face grows taut at the intransigence of the $2.1 billion Federal Aviation Administration (FAA), the government regulator of air safety that seems more concerned with the *cost* of safety to airlines than with protecting passengers.

In a word, the FAA's regulation of air safety is myopic. Although most flights are and will be safe, there are a number of flaws in the way safety is policed in the skies—deficiencies that could prove catastrophic when you most need protection. For example, under current FAA policy it's still perfectly legal for parents to hold infants in their laps and even let them play unrestricted in the cabin, even though it's always dangerous and can be deadly, as it was in the Sioux City crash and, more recently, when a child held in a lap by a parent was killed in an accident in July 1994 (USAir Flight 1016). This may change

if legislation ever passes Congress, but it's been a tragic and tortuously slow journey. Meanwhile, the FAA only "strongly recommends" that children under 20 pounds be placed in a rear-facing child seat and that children from 20 to 40 pounds use a forward-facing restraint.

Although it's a rare event for anyone—child or adult—to be killed in an air crash, it seems indefensible that built-in state-of-the-art safety devices are more numerous in automobiles than airplanes. Nearly a decade ago, the National Transportation Safety Board (NTSB) recommended that restraints in aircraft be required for children under like *400 pounds*. During an accident or severe turbulence, no parent can hold onto a child, a fact the FAA has been aware of for years. "Pets [placed in special carriers] are better protected than infants," says Brown-Lohr. "How many infants will be sacrificed? Your luggage is better protected than you are." Even the FAA's own Aeromedical Institute has found that restraining infants in car seats on planes *will* probably save *lives*. So why aren't they mandatory?

Air-safety regulation in the United States, however, often flies in the face of logic. FAA studies contend that rather than buy tickets for infants, people will choose to drive to their destinations, need for child restraints in aircraft, "It seems ludicrous that we restrain everything in the aircraft cabin except children under two. The industry and flight attendants want it, but the FAA is blocking it." Considering that some 10,000 infants fly *every day* on U.S. airlines, the FAA's position on child restraints is astonishing. While the agency suggests that parents use car seats on aircraft, it *will* not require it.

"It's a fallacy to say that people will stop flying if an extra seat needs to be purchased. Nobody will drive to see grandma if they can fly for $150," adds Brown-Lohr. "Fares can be cut [by the airlines] for infants. It amazes me

can't say, given that major airlines are constantly adding newer planes to their fleets and airline accidents are unique and typically don't reflect trends in the industry. To understand if the higher number of airline accident deaths is a trend, you have to look at the number of deaths per million miles traveled. The NTSB's "major" (involving fatalities) accident *rate in 1996 for the large carri*ers was 0.439 per million hours flown—the fifth highest in 15 years. Out of a record 5.4 billion miles flown on the major carriers, that rate is still low, but it *doesn't suggest that flying is risk-free.* In the year after ValuJet's 110 deaths and TWA 800's 230 fatalities, awareness of air safety and the fear of flying is riveting the public consciousness.

CD's objective in this investigation was to probe the relationship between safety regulation and the state of the industry. Despite the robust profitability of the top airlines (except for TWA), the FAA is required by federal law to consider the costs—and profits—of the industry in all of its safety regulations. The agency has clearly been hamstrung by its congressional "dual mandate," a partnership to promote the industry and protect passengers. This unholy alliance has forced the agency to conduct businesslike cost-benefit analyses under Office of Management and Budget guidelines to determine whether safety measures are worth the money airlines or passengers will spend to guarantee a safe or survivable flight. When it comes to the items that may most protect passengers during a crash, as in the child-safety-seat issue, a cost-benefit analysis will weigh in favor of *not* spending the money to save lives.

The FAA refuses to rank airlines on safety "because it is not statistically valid since accidents are so rare." The agency will, however, launch a Safety Performance Analysis System by October of this year to better target at-risk airlines.

Cabin Safety: The Biggest Need For Improvement. David Koch, a chemical engineer, escaped from the burning 737 that was USAir Flight 1493, only because he was able to find and force open a galley door and jump down 10 feet to the tarmac. After crawling on the aircraft floor because of the blinding, deadly smoke, he saw an overwing exit but avoided it because people were literally fighting to get out. "When I was crawling on my hands and knees, I couldn't see the [emergency] floor-light system," Koch recalls. "There was only one [accessible] overwing exit, but the damn door-latch jammed, and a woman froze [paralyzed by fear] in her seat [near it]. I knew I only had a few minutes before I was asphyxiated."

Since the accident, Koch has appeared frequently in the media and has lobbied Congress about air safety. Despite his family's prominence (the multibillion-dollar Koch Industries), Koch said he "got discouraged about the possibility of making changes. The FAA bureaucracy is staggering. The least little change takes 10 years."

USAir Flight 1493 hit Skywest Flight 5569 on a runway during a landing at Los Angeles International Airport on Feb. 1, 1991. The impact and fire killed 12 on board the Skywest Fairchild Metroliner and 22 on board the USAir Boeing 737. Although 67 passengers managed to escape from the 737, all 12 people on the Metroliner perished. Of the 22 people who died on the 737, all but one were asphyxiated by toxic smoke in the cabin, autopsies later showed. An NTSB report indicated that those who couldn't get out were poisoned by the smoke that came from ignited fuel outside the cabin.

Dr. Alex Richman, a retired university professor in Halifax, Nova Scotia, is now focusing his epidemiological research on air safety. He lost his son, David Ross, in the USAir Flight 1493 crash and is dedicating the rest of his life to making aviation safer. He's not so sure there has been much progress since Flight 1493.

After the Los Angeles crash, the official NTSB report cited the "demanding workload" in the control tower that momentarily distracted an air-traffic controller from tracking the two planes at Los Angeles. As is true throughout major control facilities today, there probably were not enough controllers in the tower in Los Angeles that day.

The cabin of the 737 was another matter. It became a deathtrap because passengers couldn't get out fast enough before succumbing to lethal smoke generated by burning fuel and cabin materials, the NTSB found. When the cabin filled with black smoke, those who didn't get out the overwing door died. Eleven people were found no more than 8 feet away from one of the exits. "They most likely collapsed [from the toxic effects of smoke inhalation] while waiting to climb out the overwing exit," the NTSB concluded, delayed by several passengers who "froze" and one seat that blocked part of one exit.

According to a report by the Flight Safety Foundation in Arlington, Va., nearly all aircraft accidents that would be considered survivable or partially survivable end up being fatal because of post-crash fires that produce toxic smoke. In a cabin, there are a finite number of ways to escape and to obtain breathable air. The emergency "yellow-cup" masks that drop down from overhead bins provide a mixture of oxygen and cabin air. At high altitudes the air is thin and contains less oxygen, and this system was designed to aid passengers during depressurization of the cabin. During a smoke or fire emergency, however, it's often a bad idea to pump in outside air, because fuel often ignites and produces toxic gases when the wing tanks break. And when plastic cabin materials catch fire or smolder, they produce deadly carbon monoxide and hydrogen cyanide gases, a fact confirmed by numerous FAA tests.

Although most airliners have "fire-blocking materials" in seats, the materials are still flammable, as are bulkheads, overhead bins and carpeting. The FAA has mandated other improvements in fire safety since the early 1980s but admits that, "in the history of cabin fires in the U.S., in otherwise survivable accidents,

WHY SMOKE EMERGENCIES CAN BE LETHAL

Although smoke emergencies are relatively rare on board commercial airliners, when they happen, they can be deadly.

- **Some 2,400 passengers have died in 95 fire-related aircraft accidents worldwide over a 26-year period, says the London-based International Cabin Water Spray Research Management Group.**
- **According to the NTSB, 969 people died in 14 accidents from 1970 to 1996 in which smoke was reported in the cockpit or cabin. The most recent incident involving deadly cabin smoke was the May, 1996 ValuJet crash in which 110 died.**
- **There are no up-to-date systems for protecting passengers from toxic cabin smoke; cabin "oxygen" masks provide a mixture of cabin air.**
- **One simple, low-cost solution could be to provide portable safety devices. Smoke hoods, which provide 15 to 20 minutes of air and cover the entire head, are standard equipment on 300 of 500 corporate jets for Fortune 500 companies. The military is also a big user of the protective breathing devices; the Department of Defense's Air Mobility Command ordered 50,000 last year.**

the post-crash fire scenario is the predominant event."

Nearly all plastics produce toxic fumes when ignited, including synthetic clothing made of polyesters. Despite this reality, all aircraft cabins conform to a *minimum* FAA standard that could be vastly improved. And airlines and manufacturers rarely go beyond that standard unless Congress pushes the FAA in that direction. The FAA has required (interior plastic) low-heat release panels, fire-blocking seats and floor-lighting systems, but isn't pushing airlines for more effective fire-safety measures such as "ultra-fire-resistant" materials or cabin fire-suppression systems. One safety expert we interviewed even suggested replacing the overhead bins with water tanks for a sprinkler system, an idea the FAA's Constantine Sarkos (an expert in cabin fires) calls "not feasible" due to the excess weight of carrying the water.

In light of the FAA's role as safety and profit czar, will the airlines and manufacturers adopt more stringent safety measures without government prodding? When we asked the largest manufacturer of airframes—Boeing Commercial Aircraft in Seattle (recently merged with McDonnell Douglas)—what it was doing in terms of fireproofing cabins, its reply was similar to the airlines: "There's nothing new in terms of fire-retardant [cabin] materials, we're in [FAA] compliance." We also contacted Airbus Industrie in Toulouse, France, the other leading manufacturer of airframes, but received no reply.

"The ugly truth is, it doesn't pay much [in the airline's view] to do safety improvements," adds Richard Chandler, a former FAA Aeromedical Institute official. Getting airlines to enact safety improvements, in Chandler's view "is an agonizingly long process that grinds along so slow that some safety ideas become obsolete."

For example, the NTSB, an independent agency that investigates major air accidents, has been recommending the installation of smoke detectors in cargo holds since 1988. Had it been enacted, this measure may have made last year's ValuJet crash in the Florida Everglades more survivable. Nearly 10 years later, however, passengers and crew still don't have this kind of protection (in what the FAA calls Class D cargo holds). A smoke "suppression" system also would have helped 14 people who died in a runway collision at the Quincy, Ill., airport late last year.

Although the FAA completes more than 73 percent of NTSB safety recommendations—and 90 percent of the "urgent" advisories—it may take decades to enact the most critical safety measures. "The FAA and industry failed to act in a timely and responsible fashion [as regards the smoke-detector issue]," charges Jim Hall, the chairman of the NTSB.

Moreover, even when the airlines volunteer to move on safety improvements—as 15 airlines did in the wake of the ValuJet crash in Florida last year—it may be just a public-relations gesture. Major airline executives stood with President Clinton and said they would install smoke detectors in the cargo holds of 737s, although they are not required by the FAA to do so (as of the end of May).

A Boeing spokesperson told CONSUMERS DIGEST that no airline has ordered the change to date because each is waiting for the FAA to order it. In its own muddled language, the FAA "is committed to propose a rule by the end of spring 1997" to retrofit Class D cargo holds with smoke detectors and fire-suppression systems. Smoke detectors are now required to be in all aircraft lavatories (prompted by other accidents), but there are no plans to put them in cabins.

Wayne Williams, a Plantation, Fla., air-safety expert who over the past 40 years has worked with the military and Eastern Airlines, says that commercial airlines often place more emphasis on operating expenses than safety. A staunch advocate of better on-board water-safety equipment (seat cushions/life vests may be inadequate and out of date)—since some 85 percent of all U.S. flights cross water at some point—Williams was told by an Eastern executive "all this safety stuff weighed too much." Shortly thereafter, he resigned

• Congress should mandate (legislation is pending) child restraints for children under two years old. No child should sit in a cabin unsecured. The FAA should research or commission independent research on child-restraint systems designed for aircraft. In the meantime, bring your own car seat and strap your child in.

• Congress should mandate the FAA to enforce carry-on luggage rules by limiting the number of bags allowed in overhead bins and force manufacturers to redesign bins and bin latches to prevent opening during turbulence.

• Smoke hoods or other protective breathing devices that provide short-term air supplies and lung/eye protection should be available upon request from the airlines. Passengers may "check them out" upon entering the airplane and return them when they leave the plane. This will reduce theft and ensure everyone who wants a smoke hood will get one.

• All flight crew on all aircraft should be issued state-of-the-art protective breathing devices that cover both mouth and eyes and provide short-term (15 to 20 minutes) air supplies. Pilots should have emergency systems installed on all aircraft that allow them to see instruments during smoke emergencies.

• The FAA should mandate a redesign of lighting systems for emergency exits. Every exit should be illuminated no matter what happens to the aircraft's electrical system (possibly using fluorescent tape around exit doors). Emergency lighting should include the ceiling; all exits can be organized into zones so that you can see them no matter where you are in the cabin.

• All exit rows should be free from seating or conform to a minimum 20-inch width. All exit slides/life rafts should be inspected and certified as fully functional. Newer planes should maintain or add more window exits and install stronger "24 g" seats (the latest minimum is 16 g) with proper cabin-floor reinforcement. All over-wing doors should have illuminated instructions on battery backup systems.

• Seat design in general should be improved with installation of shoulder harnesses, aft-facing seats and air bags in bulkheads.

• The FAA should mandate installation of smoke detectors in "Class D" (mostly Boeing 737) cargo holds and enforce the installation with a definite timetable. Fire-suppression systems for both cargo holds and cabins should be researched, provided that funding is increased by Congress for these items.

• The FAA's funding should be increased for major cabin survivability items such as anti-misting fuel, ultra-fire-retardant cabin materials and fuselage protection from fuel-tank ruptures.

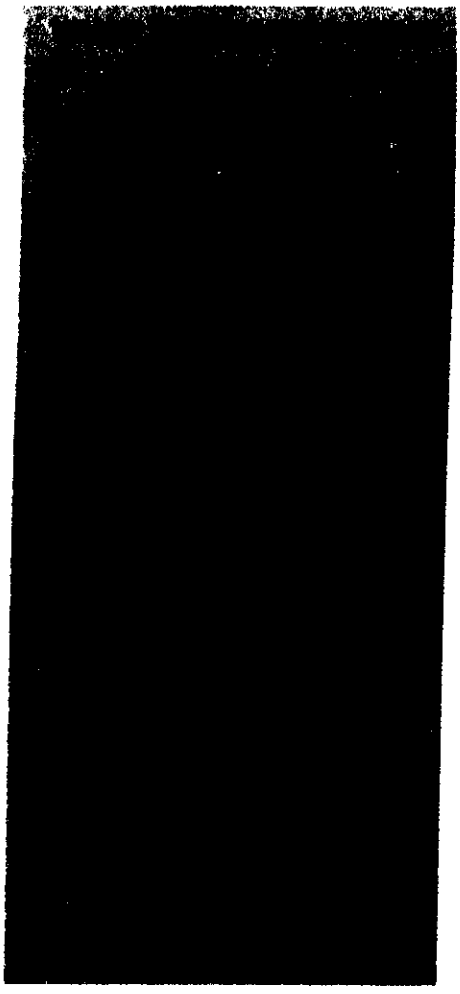
• The FAA should research and improve water-protection devices and procedures. That means redesigning flotation devices and improving water-landing training.

from the now-defunct airline, which had a troubled safety record toward the end of its existence.

Even when the FAA knows there's a safety crisis, it's slow to react. Notes Richard Snyder, a former FAA official who's probed some 3,000 air accidents in 40 years, "The FAA is one of the biggest bureaucracies there is; it only reacts under great pressure after a crash [involving fatalities]."

Legislators are also frustrated with the FAA's sluggish nature in fixing safety shortfalls. Former Sen. Howard Metzenbaum was successful in passing a law mandating that the FAA improve life vests and flotation devices in 1988. Once the law was digested by the FAA, however, it never became a "Federal Aviation Regulation (FAR)," which directly governs airlines. In its rulemaking process, the FAA peformed several cost-benefit analyses and found that the cost of improving life vests (for children in particular) didn't meet the cost benefit for *airlines*. Such is the FAA's conflicted mission, or dual mandate, where it's empowered to police safety but also must prove it won't hurt airline profits. Despite a reauthorization of the FAA last fall, the dual mandate was changed in wording only from "promoting" the industry to "encouraging."

"The FAA let down the American people," Metzenbaum said of the process that effectively killed his safety improvements. "How can you justify



1993. Witkowski notes similar delays on life vests and fire-safety seats. "It doesn't appear the FAA has followed the

ening of air-travel experiences. It can happen over any terrain, body of water or during any kind of weather. "Clear-air" turbulence is the most unpredictable since it can happen anywhere and it can't be seen on radar, according to Dr. Shari Stamford Krause, author of *Aircraft Safety* (McGraw-Hill, 1996). Most turbulence happens over bodies of water, adjacent to where most of the busiest airports are located.

Turbulence is a pronounced threat to your safety because it can shake loose the contents of overhead bins, food-service carts or dislodge anybody standing in aisles or not belted. Using industry numbers, an estimated 1,200 people were injured last year due to overhead bin "displacement" alone. That translates to nearly three accidents a day if you average them out.

All of the safety experts we interviewed for this article have had an experience in which contents from the overhead bins fell out. "I've been hit over the head more than once," recalls Jim Burnett, the former NTSB chairman. "Carry-on baggage should be put under the seat; it's fairly safe there. The overhead bins are of a poor design."

Since 1970, the NTSB has found that "almost 60 percent of the large transport aircraft involved in survivable and partially survivable major accidents and incidents investigated by the safety board have exhibited failures of cabin furnishings [namely overhead bins]."

Continued from page 25

bins above you and perhaps choose a window seat.

A View From The Tower: An Air-Traffic System At Risk. If you ascend into a busy airport control tower, such as the one at Chicago O'Hare International, you see how the angels of our better nature work. Aircraft ascend into the clouds as if they are weightless and disappear into the firmament. Controllers guide them safely into the sky and onto the ground on a regular basis. They are peering out the tower windows, talking to pilots and gazing at radar screens. Unseen hands and quick minds make it all seem so fluid. Yet there's always been a bitter debate over whether there are *enough* air-traffic controllers watching over us. Every air-safety expert we talked to suggested that staffing levels are inadequate to handle the traffic, since President Reagan fired striking Professional Air Traffic Controllers Organization members in 1981.

Busier airspace controlled by old and newer, often unreliable equipment (Doppler, airport surface detection radar) simply demands more "eyes on the ground" in the guise of controllers. For example, Chicago O'Hare International Airport served more than 69 million passengers last year and 909,000 flights. But the Chicago "routing" center for midwestern airspace only recently updated its 30-year-old computer system, after several shutdowns over recent years threatened its integrity.

The FAA insists that all of its facilities are safely run and that's hard to dispute. Bob Frink, the FAA manager at O'Hare tower, says his controllers had six errors out of more than one million operations last year, none of which resulted in an accident. O'Hare, however, is the premier operation of the world's airspace system. If O'Hare has problems or delays, airline chief executives are on the phone to Washington. Flights are delayed all across the globe and airlines can lose millions. Most airports, though, are not O'Hare.

The controller work force as of Dec. 1, 1996, was 17,080, according to the FAA. That's about 1,100 controllers short, according to FAA officials in six of the nine regions studied, who were queried by the General Accounting Office (GAO). A recent GAO report claims that 32 percent of air-traffic facilities were "staffed at levels more than 10 percent below [the FAA's own] standards." Where are you likely to fly into an airspace watched over by a shortage of controllers? Although the GAO report didn't specifically mention them, a GAO researcher told us that the Central (Midwest), Eastern, Great Lakes, Southern, Southwestern and Western Pacific regions are understaffed by at least 10 percent. The ultra-busy New York center, which controls airspace over La Guardia, Newark and JFK International, is reportedly 50 controllers short and plagued by high turnover, according to Chris Boughn, the New York local president of the National Air Traffic Controllers Association (NATCA). Even a far-flung center at San Juan, Puerto Rico, a hub for the Carribbean, is 30 controllers short, NATCA estimates.

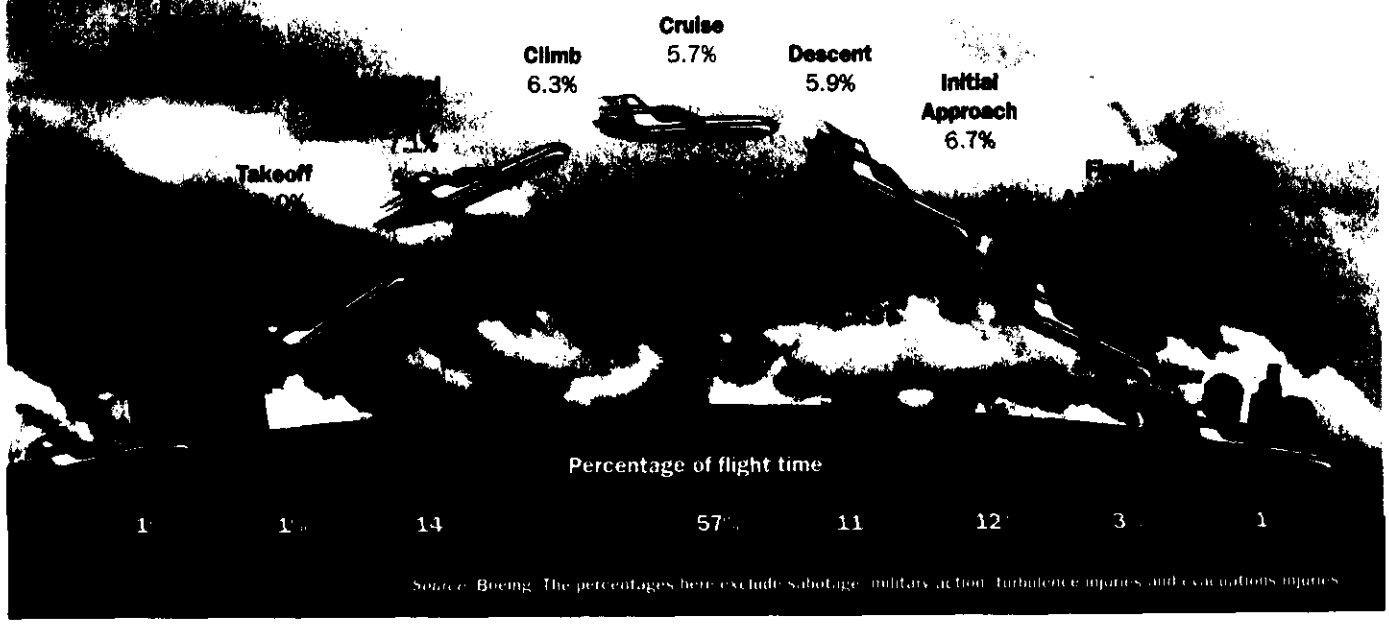
Controller understaffing is most critical at airports that have other safety problems, such as Los Angeles International and San Francisco, which are both rated "deficient" by the London-based International Federation of Airline Pilots Association (IFALPA; see page 74 for more details).

The FAA plans to hire 500 new controllers in 1997 (fiscal year) and 800 in 1998. Although the GAO and NATCA have repeatedly pointed to understaffing, too few controllers covering increasingly busy airspace is even more of a hazard to air safety. The FAA, however, "still does not have a complete understanding of how many controllers are required at each facility," according to a recent National Research Council study.

With experienced controllers retiring

WHEN DO YOU FACE THE GREATEST RISK?

If you're a nervous flier, you probably dislike takeoff and landing the most. Statistics confirm your anxiety. Even though the takeoff, the initial climb, the final approach and the landing only consume 6 percent or less of your time in the plane, these are the phases of flight in which more than 70 percent of all accidents occur. The riskiest portion of the flight is the final approach and landing, during which more than half of all accidents occur. Boeing surveyed the worldwide commercial jet fleet for the 1959-1995 period and came up with this graphic; the percentages are based on a 1.5-hour flight.



Source: Boeing. The percentages here exclude sabotage, military action, turbulence injuries and evacuations injuries.

ROB SCHUSTER

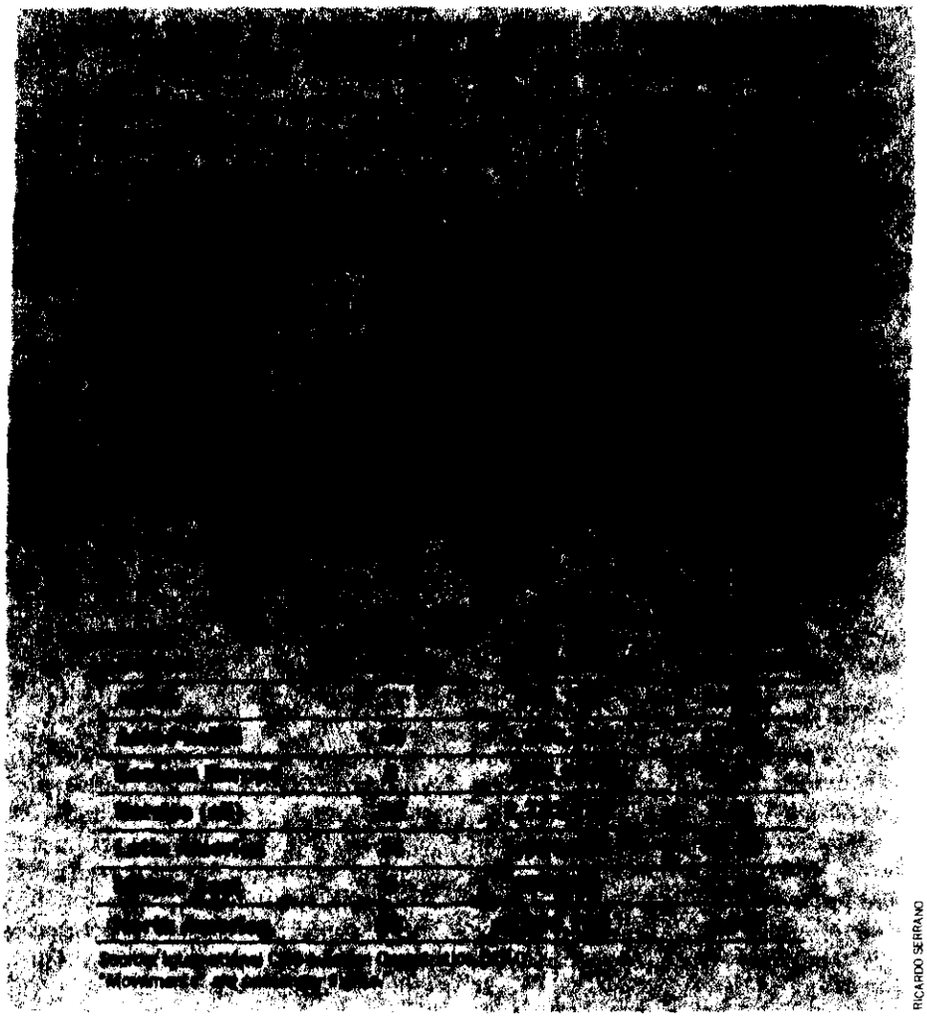
(they are required to retire by age 56 or after 20 years of service), present and future short-staffing is creating possible safety shortfalls in the controller work force. The Washington, D.C. center has about 50 percent of its controllers eligible for retirement this year, Boughn adds, a widespread situation that will create a vacuum of experience throughout the system in the next five years.

Barry Krasner, NATCA's president, told the White House Commission on Aviation Safety and Security last year that the FAA should hire "2,677 additional controllers in 1997, with 500 more per year for the next five years."

Questionable Airports. When CD staff conducted an informal survey of pilots, safety experts, controllers and government reports on the subject, we discovered that some heavy-traffic airports have a number of key deficiencies that need to be addressed. The location of some airports can be dangerous because of restricted approaches and their proximity to numerous obstructions (Washington National, San Diego), runways that have inadequate overruns that allow little margin for error (La Guardia), or noise-abatement ordinances that tend to impair a pilot's ability to take off and land (Los Angeles). Other airports can become dangerous if key systems (air-traffic control) go down and pilots are forced to "fly blind" in bad weather or are unaware of other air traffic. Another tier of airports even lacks control towers to guide aircraft in and out—despite relatively heavy traffic.

Although the FAA may take years—even decades—to install new safety technology at airports or air-traffic control facilities, it earmarks the best safety technology for only a handful of facilities. And it may take years to install those crucial systems due to the FAA's antiquated procurement policies, contractor problems (that actually cause system failures), inadequate budgeting and just plain bad decisions. Bureaucratic sluggishness has its price. The technology is often the bridge to getting pilots into safe airspace.

Wind shear and microbursts (severe downdrafts in the middle of storms) are among the most lethal weather conditions. According to NTSB estimates, 17 major fatal accidents between 1970 and 1989 were caused by this hazard. Doppler radar was universally heralded as the technological marvel the industry needed to warn pilots of microbursts and wind shear during the most vulnerable



RICARDO SERRANO

times of flight—during takeoff and landing (see page 71). Linked with a computer, Doppler shows controllers in bold colors where killer downdrafts are most likely to occur around an airport. From there, it's a simple matter for a controller to redirect a pilot.

The Doppler system, however, is only a solution if it works when it's needed most. Thunderstorms often cause power surges and outages in local electrical supplies, which can shut down vulnerable computer systems. When are microbursts most likely to occur? During thunderstorms. A backup "uninterruptible power supply" (UPS) would ensure that Doppler could operate during power surges or "bumps," but the FAA didn't install them when it "commissioned" the Dopplers. Why? The FAA's response to this problem was vague. Although it had UPS for Doppler on a "national" level, "sitewide UPS were not required nor designed for the system." Only three locations have "sitewide UPS based on the low quality of local commercial power."

Although no major accident or incident has been traced to recent Doppler system failures, it's an unsafe situation that both pilots and controllers have been urging the FAA to fix. According to Ben Phelps, safety director for NATCA, there were 181 Doppler outages (from May 1 to Nov. 1 of last year alone) at busy airports such as Chicago, Atlanta, Los Angeles International, Denver, Boston, JFK and St. Louis.

Doppler isn't the only safety system that goes down because of FAA decisions. Power surges also knock out Airport Surface Detection Equipment (ASDE) systems that help controllers prevent ground collisions and runway incursions (aircraft on runways where they shouldn't be). If you're a pilot, you have a harder time flying safely if your "eyes on the ground" are blinded.

It's fairly well-documented that the government has spent billions on systems that don't work and may even create more safety problems. In this regard, the FAA's troubled culture is making pilots' work more difficult and increasingly dangerous. Brian Power-Waters, a retired pilot and author of air-safety books, says the FAA has spent $1.5 billion on systems that have gone nowhere.

Fixing the systems often creates more problems. Contractor-caused outages while installing, upgrading or fixing FAA systems are "our number one problem," says Stephanie Voyda of the Professional Airways Systems Specialists, Washington, D.C., an organization that represents FAA technicians and inspectors. One contractor-caused outage knocked out the air-traffic control system at the FAA's Aurora, Ill., routing facility, which controls some of the busiest airspace in the country.

One case in point is an attempt to save money by automating basic weather information at airports. The idea was a bureaucrat's dream: eliminate highly paid weather observers with a machine that automatically relays information on wind speed, temperature and precipitation to pilots upon request. On paper, the National Weather Service's $350 million Automated Surface Observation System (ASOS) seemingly had the potential to save millions in labor costs. Intended to replace human observers entirely, it's evident that the 538 systems the FAA has bought (now working at 152 facilities with 486 more in the pipeline) will cost even more money—some $259 million—because they may not work when they're needed most. Moreover, the systems allegedly work so badly that it's unlikely that they will ever replace human observers.

NATCA's Richard Swauger found that ASOS "is totally incapable of reporting a host of critical weather phenomena such as thunderstorms, hail, freezing rain, tornadoes or even snow depths that may severely affect an aircraft landing or taking off." Adds NATCA's Cal Smith, "ASOS wouldn't know it if hail pounded it. [The FAA is] working on a solution."

Pilot reports filed anonymously with NASA's Aviation Safety Reporting System (ASRS) confirm controllers' assertions about ASOS. One pilot flying into Denver after ASOS didn't report hazardous icing conditions stated, "mine was an icing encounter that [could] have ended in tragedy." Two pilots flying into Dallas-Fort Worth reported that ASOS "gives a dangerously misleading impression that the weather is good when in fact it may be very bad." The FAA claims the system is "94.37 percent" reliable.

Fortunately, the major airports back up ASOS with weather observers and controllers in towers. In smaller airports, however, pilots may not have that safeguard. In non-towered airports or airports where controllers must double as weather observers, pilots have to fly without any meaningful help.

Runway incursions are also on the rise, according to the FAA's own figures. After declining every year since 1991, runway incursions rose 18 percent in 1995 from the previous year. Four catastrophic accidents have been linked to runway incursions over the past six years, with fatal collisions at Detroit, St. Louis, Atlanta, Los Angeles and Quincy, Ill., according to the NTSB, which highlights runway incursions on its "Most-Wanted Safety Improvement List."

The FAA has a runway incursion action plan in force and is testing new "AMASS" software with its surface radar system at San Francisco International and three other airports. Controllers say the agency has a long way to go on this safety issue, though, since the FAA has pulled funding for improvements in the surface-detection software. Also troubling: Most surface radar systems now in use are prone to power outages and don't give controllers audible warnings to alert them of imminent collisions. To date, though, only 23 of 40 ASDE systems are operational at major airports.

Non-towered airports also may pose a threat to air safety. Although there are strict rules for pilots to follow when using an "uncontrolled" airspace, many smaller airports are taking more and more major airline flights, especially in popular resort areas. Airports at Hilton Head and Spartanburg, S.C.; Jackson Hole, Wyo.; Telluride and Vail, Colo.; Kingman, Ariz.; Hot Springs, Ark.; and Mayaguez, Puerto Rico, are but a handful of towerless airports where major carriers fly, says the Airline Owners and Pilots Association.

The FAA says that of the 746 airports with scheduled commercial service, 435 don't have towers. Since most of the country's 18,268 airports serve the military, small aircraft or "general aviation," that's generally not a problem. Nevertheless, after more than four months of probing, nobody at the FAA could name the busiest non-towered airports. Non-towered airports are run by specific FAA guidelines and *are not* patently unsafe, but full-time towers give an extra measure of safety, especially where larger aircraft run scheduled flights. One FAA report found that non-towered airports experienced 9.7 accidents per million operations vs. 4.5 at towered airports. So by the FAA's own estimates, the accident rate is more than double at a non-towered airport.

"If something doesn't change, there will be more

Like the entire realm of air safety, rating airports is notoriously difficult. On most days, when all systems are working, the sky is unthreatening, aircraft are functioning and controllers and pilots are doing their jobs, you'll have no problem. As is the case with any complex system, though, a breakdown in any part of the system could spread dangerous ripples throughout.

DEFICIENT NORTH AMERICAN AIRPORTS

Facility	Safety Hazard (deficiencies)
Los Angeles Intl	Congestion, runways (Red Star/Class 2)
San Francisco Intl	Weather, close parallel runways (Black Star, Class 3)
Toronto	Runway/navigation (Orange Star, Class 1)

Source: IFALPA Annex 19 (see page 79 for "star" ratings).

Boston Logan	Short overruns, water
Detroit Metro	"Spaghetti" runways, poor markings
La Guardia/N.Y.	Short runways/overruns, obstructions, water, expressway
San Diego Lindbergh	Only one runway, obstructions
Washington National	Limited approach, obstructions

Hong Kong International	Black Star
Italy—Rome/Milan (both)	Orange Star
Ireland—Shannon	Orange Star
Israel—Tel Aviv	Red Star
Japan—Narita/Osaka/Haneda	Orange Star
Mexico City International	Red Star

Source: International Federation of Airline Pilots Association (IFALPA).

midair and ground collisions," says Ed Wachs, president of the Aviation Safety Institute.

IFALPA publishes a list of airports with "critical deficiencies" worldwide. These lists, compiled by pilots who routinely use the facilities, rate specific safety hazards. The airports with the most "critically deficient" hazards in the pilots' "Annex 19" report are given "black stars" by IFALPA. The second most criticized airports merit a "seriously deficient red star," followed by a "deficient orange star." Although IFALPA's London headquarters and its affiliate organization, the Airline Pilots Association (ALPA), refused to release the Annex 19 report to CONSUMERS DIGEST, we were able to obtain a copy. An IFALPA spokesman said that the organization wouldn't release the list "because it preferred to work with local civil aviation authorities to correct the deficiencies."

IMPROVEMENTS PILOTS WANT, BUT THE FAA DELAYS: ALPA'S HOT LIST

We asked the Airline Pilots Association (ALPA) for its highest-priority (nontechnical) suggestions to correct faults in the airspace system. They've requested that the FAA make several critical changes regarding airports and air safety. ALPA also is working with the FAA on revised standards on flight-duty rest requirements that will address the problem of tired, overworked pilots (tired pilots make mistakes), but the standards had not been published as this went to press.

Emergency Evacuation Lighting and Marking Requirements (making exit from a plane in an emergency easier and safer).

Interior Materials and Passenger Seat Cushion Flammability. Although most airliners are made or retrofitted with fire-blocking materials in seats, the materials are still flammable and produce toxic gases when ignited.

Cargo & Baggage Compartments. These should be lined with fire-resistant materials and equipped with smoke detectors.

Landing Lights, TCAS-II (a collision-avoidance system that should be on all cargo aircraft but is not required by the FAA); minimum altitude for use of autopilot and use of certified airports.

Protective Breathing Equipment. Up-to-date equipment would protect a pilot's eyes, nose, mouth and lungs during a smoke emergency.

When it comes to flying a modern aircraft, a dazzlingly sophisticated and knows air-safety regulation thoroughly. Despite her work with the White

on passenger aircraft.

• At a cost of 4 cents per ticket, provide breathing devices (i.e., smoke hoods) that protect passengers and crew against toxic smoke.

• Eliminate the FAA's authority to issue private exemptions or waivers to safety and security rules, except in limited and controlled circumstances.

• A long list of bomb-detection and security measures can be funded through a $4-per-ticket surcharge.

As Cummock noted, the FAA grants exemptions or waivers of its own safety rules but doesn't make them public. The majority of the waivers (167) over the past 10 years were requested by the powerful Air Transport Association (ATA), a trade group that represents the largest airlines. We obtained a list of these private exemptions through a Freedom of Information Act (FOIA) request. These passes on flight-safety rules are issued privately to airlines on an individual basis or through industry-wide requests filed by the ATA.

It's difficult to tell if these exemptions have led to an accident or compromise daily air-travel safety. Some are simply personal requests to hang-glide or fly a special kind of aircraft. And the FAA denies many of them. In short, these private exemptions present a highly incomplete picture of air-safety regulation.

When CD requested a complete list of the safety exemptions through FOIA, we received only 100 of the more than 2,000 major-airline exemptions covering the past decade. The 42 petitioners included the leading aircraft manufacturers, ATA and 30 of the Part 121 (largest) carriers (including defunct carriers such as Eastern and Markair).

The most serious exemptions (not all of which are granted) ask the FAA to waive rules on emergency evacuation, life rafts or emergency exits. The Association of Flight Attendants and other safety-oriented groups have fought these waivers for years—especially regarding safety issues—but have to battle the airlines, ATA and the FAA to do so. Other subjects for exemptions involved emergency procedures and equipment; protective breathing equipment for crew; flight recorders and pilot/crew proficiency checks.

"The private exemptions should be made public," asserts Jim Hall, NTSB chairman, who is also unsure whether the waivers compromised safety.

True safety measures aren't possible, however, in an environment that stifles safety improvement and innovation. The irony with the FAA is that it already has high-quality research, facilities and the means to turn research into lifesaving safety regulations. Reliance upon cost-benefit analyses to justify safety improvements has killed a number of promising safeguards. "When I was with the FAA, we did up to three [safety-related] reports per year, but they were scrubbed because they weren't acceptable to the FAA leadership," adds former FAA researcher Richard Snyder.

Following the ValuJet crash, it's been well publicized that the FAA was lax on policing bogus parts and third-party maintenance. In one of three FOIA searches CONSUMERS DIGEST conducted for this article, we discovered that it was the Department of Transportation's Inspector General's office that showed the most glaring deficiencies in the system of airline inspection. Some inspectors are simply not even qualified to survey the aircraft under their jurisdiction.

The airline industry wouldn't make money if safety weren't a daily priority. The best safety experts are pilots, controllers, mechanics and flight attendants, yet they may lose their jobs if they expose dangerous practices. Unlike most federal employees, this first line of safety personnel is not protected if they "blow the whistle" on unsafe practices. That's why NASA's Aviation Safety Reporting System protects its reporters and contains no information about flights or aircraft.

"We're likely to see more accidents in the future due to the shortcomings of the system," concludes Robert Poole, president of the nonprofit Reason Foundation. At nearly every turn, though, the FAA juggernaut turns safety into a perilous paper trail. Reforms can be enacted to make the FAA a state-of-the-art force in air safety. Congress needs to review how the agency should work and make it more "proactive" and not "reactive" in the aftermath of a fatal air accident. Only drastic, meaningful reform will transform the airspace system into the safest mode of transportation it should be—and make the dire NASA and Boeing air-fatality predictions a false prophecy.

Most people assume it's safer to fly the major airlines than commuter services, air-taxi aviators or private planes (general aviation), and they're right, as the top table below shows. Of greater concern for the flying public, though, is the difference between classes of "major" carriers—low-cost airlines vs. the nine largest U.S. airlines (bottom table).

ACCIDENT RATE BY CLASS OF AIRLINES, 1996

Carrier Class	Accident Rate Per 100,000 Flight Hours	Total Number of Accidents
Major Carriers	0.28	38
Commuter Airlines	0.44	11
Air-Taxi Services	4.57	87
General Aviation	8.06	1,907*

*This rate was a 15-year low for general aviation.
Source: FAA 1996 Annual Report.

LOW-COST CARRIERS VS. THE 'MAJORS': COMPARING SERIOUS ACCIDENT RATES

Carrier Group	"Serious" Accident Rate Per 100,000 Flight Hours
Low-Cost Airlines[1]	0.123
Low-Cost without Southwest	.602
Major Airlines[2]	0.078

[1]Low-cost airlines include Air South, American Trans Air, Amerijet, Carnival, Frontier, Kiwi, Morris, Reno, Southwest, Spirit, Tower, ValuJet, Vanguard and Western Pacific. Southwest has never had a serious accident. The majority of the accidents in this group occurred at Tower, with an accident rate of 8.68 per 100,000 flight hours, ValuJet (4.228), Carnival (2.74) and American Trans Air (0.562). [2]The nine "major" airlines are America West, American, Continental, Delta, Northwest, TWA, United, US Airways and Alaska.

Source: FAA.

Finding Good Information Is Nearly Impossible. We polled major carriers in an effort to find relationships between corporate culture and safety (see page 76). The airlines, by and large, were forthcoming with basic details of their safety programs, although none would say how many injuries or lawsuits result from turbulence incidents. Since airlines with older fleets may spend more to maintain their aircraft than smaller, younger airlines, there is no standard way to measure maintenance spending. Nor could the FAA provide this information. When you call its safety hotline (800/FAA-SURE), a recording tells you immediately that no airline safety rankings are available and refers you to its Oklahoma City facility for

When choosing among competing airlines, it would certainly be convenient to book a ticket based on a standard safety rating. Unfortunately, there simply isn't enough information available to the public upon which to base such ratings. And what information is available is unreliable, underreported or incomplete. For example, no judgment can be made about a given airline's safety record without complete maintenance records for the airline's entire fleet. Neither the airlines nor the FAA make such information available. For the commuter/regional airlines, even less information can be assembled.

Based on the limited information we could obtain on the top nine airlines, we can say they are probably operating at equivalent levels of safety. Of course, you can't fairly compare an American, Northwest, United or Delta—all of which fly national/international routes—with America West, Southwest or Alaska, which only fly domestically. All reputable airlines, however, have some similarities in the way they promote a "corporate safety culture," although there is no way at present to tell if one airline is safer than another (and why the FAA makes no attempt at a public evaluation is another issue). Nevertheless, there were some key factors that are worth examining.

Average fleet age is measurable and important because newer jets may require less maintenance. All of the major airlines have an average fleet age under 15 years; the youngest fleets—under 10 years old on average—are run by Southwest, American, TWA and Alaska.

We also considered an **airline quality rating** published by Wichita State University; it measures average fleet age and financial stability of the airline, along with a number of non-safety-related factors. Southwest, United and American scored above-average in this rating.

In addition, the FAA compiles **rates of serious and fatal accidents.** Airlines with below-average serious-accident rates include Southwest, American, Northwest, Delta and America West. Above-average serious-accident rates are attributed to Continental, US Airways, TWA and United.

Aborted takeoffs (as reported in the NTSB/FAA "cross-system" search through the FAA Web site) revealed a higher-than-average rate for Continental and Alaska, although weather problems and reporting errors may account for the anomalies.

Safety officers at a high corporate level may indicate a greater commitment to passenger safety. We analyzed how much safety was promoted at every level of the company's operations. Industry experts concur that a commitment to safety from the boardroom that reaches every employee from mechanics to pilots is the most meaningful human and organizational factor in policing safety. The FAA has neither the inspectors nor the resources to inspect every aircraft, pilot or maintenance shop at every airline, so the airlines are essentially self-regulated when it comes to safety. Each of the top nine carriers has a safety officer with at least 20 years of aviation experience who reports directly to chief executives.

We favor airlines that maintain **in-house weather departments** that work with dispatchers to avoid hazardous flying conditions. All of the airlines we surveyed (except US Airways) have in-house staffs dedicated to this task. For Aloha and Hawaiian, this isn't as important a factor, since they fly primarily in good weather. Our preference is for the companies that have long standing (in place more than 10 years) safety departments and in-house meteorologists. Every airline has a policy to avoid turbulence and is required to have a safety officer.

We sent surveys to the airlines, examined 10-K/annual reports, and surveyed pilots, court documents and industry safety experts. Each airline was contacted at least three times. We asked questions about their chief safety officers, the depth of safety programs and how many of the company's aircraft had been retrofitted with fire-blocking materials. We also favor airlines that have spent money on definite safety improvements such as fire-blocking seats and cabin furnishings, extended training and new technologies that make all-weather flying safer.

AIRLINE SURVEY HIGHLIGHTS

Major Airlines

Alaska: Its safety record is excellent, which is noteworthy considering the conditions under which the airline often flies; it's a technology leader in weather and navigation systems.

American/American Eagle: With 19 staff meteorologists, the in-house weather department is top-rated, and the company's "aviation safety action partnership" program is worth recognition.

America West: The entire fleet is equipped with fire-blocking seats, and it has an enhanced weather information system.

Continental/Continental Express: Color weather radar is installed in all of its aircraft, and all aircraft are equipped with fire-blocking seats.

Delta: It has large weather (18 meteorologists) and safety (22 people) departments, plus a turbulence task force.

Northwest: It has extensive weather and pilot-safety rules and maintains a service-difficulty database.

Southwest: The safety record is excellent (Southwest has never suffered a fatal crash), and it flies only one aircraft type (Boeing 737s); plane interiors have been upgraded with fire-blocking materials.

TWA: All of its aircraft are equipped with fire-blocking seats, and it has a mature safety program—it established its in-house weather department in 1930. The only question mark is the company's finances.

United: The corporate safety and security division has 50 employees, and all aircraft have been retrofitted with fire-blocking materials.

US Airways: As USAir it suffered past accidents, and the company is restructuring, but corporate safety is an "integral part of all operations."

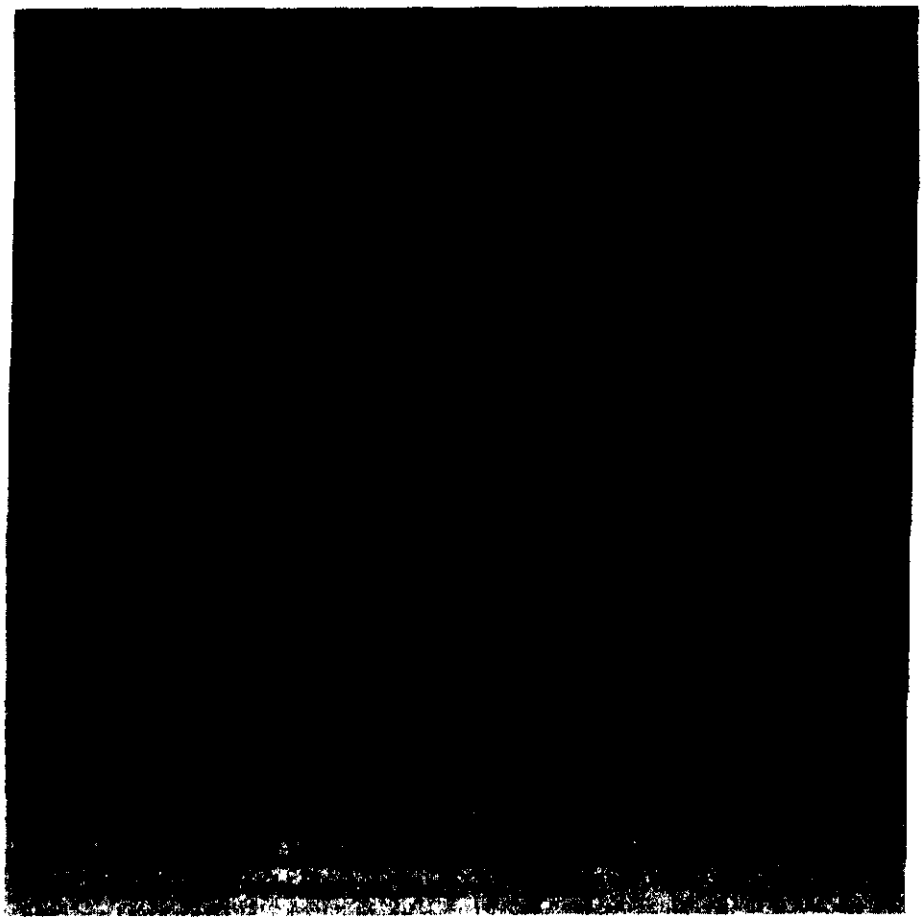
Commuter/Regionals

Alaska: All aircraft are equipped with fire-retardant materials.

American/Trans Air: All aircraft have been equipped with fire-blocking seats and fire-retarding interior materials.

Continental Airlines: All aircraft in this Pacific regional fleet feature 16g seats.

Hawaiian: Flying almost exclusively in excellent weather, the safety record is good.



(misleading) accident and incident data.

What information should be made available to give you a better picture of airline safety? It's widely acknowledged that airlines don't routinely report all of their mechanical problems to the FAA. Since the FAA has no way to check every plane due to lack of trained inspectors, it needs to better focus its resources on identifying problem carriers before accidents occur. It's also difficult to track the more than 12,000 unscheduled landings a year—in which some 39 to 41 percent (from 1990 through 1995) reported some type of mechanical problem, according to *Quantitative Reports on Aviation Safety,* a newsletter based in Halifax, Nova Scotia. Our suggestion: The FAA should come up with a standard measure of maintenance spending that accounts for the age and type of fleet and identify mechanical problems that force aborted takeoffs and unscheduled landings.

Fines levied by the FAA for safety violations are suspect, so we didn't include fine information, even though the FAA made this information available to us. The GAO has criticized the uneven enforcement of airline safety, which targets a handful of small airlines and pays less attention to larger problems until a tragedy strikes (ValuJet is cited as a key example). Adds Michael Pangia, a former litigator for the FAA, "The FAA is quite lax with larger carriers. They go after the little guy with fines and let the bigger carriers slide."

Jim Burnett, the former NTSB chief, observes "the real problem with the FAA is the 'partnership' rhetoric. [The FAA] won't get too aggressive in enforcement of current rules."

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